TECHNICAL INFORMATION

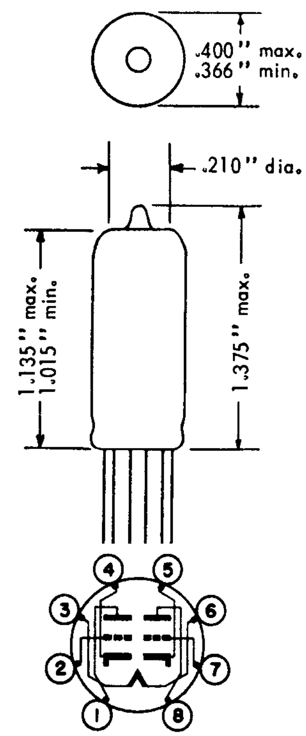
RAYTHEON

Excellence in Electronics

SUBMINIATURE DOUBLE TRIODE

TYPE CK7079

The CK7079 (CK632) is a heater-cathode type medium-mu double triode controlled for fast warm-up time and high peak current pulse emission. It is of subminiature construction, capable of operation in the UHF region and is designed to have a high degree of reliability under adverse environmental conditions. This tube is characterized by long life and stable performance. It is designed for service where severe conditions of temperature and vibration are encountered. This type has electrical characteristics similar to the CK6111. The flexible terminal leads may be soldered or welded directly to the terminals of circuit components without the use of sockets. Standard 8-Pin subminiature sockets may be used by cutting the leads to a suitable length.



BOTTOM VIEW

8DG

MECHANICAL DATA

ENVELOPE: T-3 Glass

BASE: Subminiature Button 8-Pin (0.017" tinned flexible leads. Length: 1.5" min.)

TERMINAL CONNECTIONS:

Lead 1 Plate, Unit #2	Lead 5 Cathode, Unit #1
Lead 2 Grid, Unit #2	Lead 6 Heater
Lead 3 Heater	Lead 7 Grid, Unit #1
Lead 4 Cathode, Unit #2	Lead 8 Plate, Unit #1

MECHANICAL RATINGS:

Maximum Impact Acceleration (Shock Test—Note 3)	30 G
Maximum Bulb Temperature	220 °C

MOUNTING POSITION: Any

ELECTRICAL DATA

CAUTION-----To Electrical Equipment Design Engineers: Special attention should be given to the temperature at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions other than those specified for life test are imposed on the tube and will be reduced appreciably if maximum ratings are exceeded. Both reliability and performance will be jeopardized if filament voltage ratings are exceeded. Life and reliability of performance are closely related to the degree that regulation of the heater voltage is maintained at its center rated value.

RATINGS AND NORMAL OPERATION:	MIL-E-1 SYMBOL	ABSOLUTE MINIMUM	NORMAL TEST CONDITIONS (Note 5)	NORMAL OPERATION (Note 4)	ABSOLUTE MAXIMUM	MIL-E-1 UNITS
Heater Voltage (Note 6)	Ef:	5.6	6.3	6.3	7.0	V
Plate Voltage	Eb:	----	100	100	165	Vdc
Grid #1 Voltage	Ec1:	−55	0	0	0	Vdc
Plate Dissipation (per plate)	Pp/p:	----	----	0.85	0.95	W
Grid #1 Circuit Resistance	Rg/g:	----	----	1.0	1.1	Meg.
Heater-Cathode Voltage	Ehk:	−200	----	100	+200	Vdc
Plate Current (per plate)	Ib/p:	0.5	----	----	22	mAdc
Grid Current	Ic/c:	----	----	----	5.5	mAdc
Cathode Resistance (per unit)	Rk:	----	220	220	----	ohms
Transconductance (1) (per unit)	Sm(1):	----	----	5000	----	μmhos
Amplification Factor (per unit)	Mu:	----	----	20	----	

Tentative Data

ELECTRICAL DATA (cont'd)

CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1)

(In the following tests, each unit is tested separately)

TEST	CONDITIONS	AQL %	MIL-E-1 SYMBOL	MIN	BOGIE	MAX	MIL-E-1 UNITS
MEASUREMENTS ACCEPTANCE TESTS, PART 1							
Heater Current:		0.65	If:	275	300	325	mA
Heater – Cathode Leakage:	Ehk=+100Vdc	0.65	Ihk:	----	----	5.0	μAdc
	Ehk=–100Vdc		Ihk:	----	----	5.0	μAdc
Grid Current:	Rg=1.0 Meg.	0.65	Ic (1):	----	----	–0.3	μAdc
Plate Current (1):		0.65	Ib (1):	6.0	8.5	11.0	mAdc
Plate Current (2):	Ec1=–9.0 Vdc	0.65	Ib (2):	----	----	100	μAdc
Transconductance (1):		0.65	Sm (1):	4100	5000	5900	μmhos
Continuity and Shorts (Inoperatives):		0.25	----	----	----	----	----
Mechanical:	Envelope (8–1) (Note 8)	----	----	----	----	----	----
MEASUREMENTS ACCEPTANCE TESTS, PART 2							
Insulation of Electrodes:	Ef=6.3 V Eg–all=–100 Vdc	2.5	Rg1–all:	100	----	----	Meg.
	Ep–all=–300 Vdc		Rp–all:	100	----	----	Meg.
Plate Current (1) Difference between sections:		2.5	ΔIb:	----	----	2.0	mAdc
Transconductance (2):	Ef=5.6V (Note 7)	2.5	Δ_{Ef}Sm (2):	----	----	15	%
Warm–Up Time:	(Note 9)	2.5	t:	----	----	11	sec.
Pulse Emission:	Ef=6.3 V; Ebb=150 Vdc; tp=10 μsec.; RL=100 ohms; Prr=200 pps; egy/ik=1 amp; Ec1=–9 Vdc; Rk=1 ohm	1.0	egy:	----	----	100	v
Amplification Factor:		4.0	Mu:	17	20	23	----
Capacitance:	(Note 2)	6.5	Cgp:	1.2	1.5	1.8	μμf
Capacitance:			Cin:	1.4	1.9	2.4	μμf
Capacitance:			Cout (Unit #1)	0.20	0.28	0.36	μμf
Capacitance:			Cout (Unit #2)	0.22	0.32	0.42	μμf
Capacitance:			Cgg:	----	----	0.011	μμf
Capacitance:			Cpp:	----	----	0.50	μμf
Temperature Cycles:	T=–62 °C to +100 °C. (Note 11)	6.5	----	----	----	----	----
DEGRADATION RATE ACCEPTANCE TESTS							
Vibration (1):	F variable 10–75–10cps; G max.=10; fixed amplitude; Rp=10,000 ohms; t=30 minutes (Note 10)	6.5	Ep:	----	----	100	mVac
Vibration (2):	F variable 75–500–75 cps; G=10; Rp=10,000 ohms; t=30 minutes (note 10)		Ep:	----	----	100	mVac
Subminiature Lead Fatigue:		4.0	----	4.0	----	----	arcs
Shock:	Ehk=+100 Vdc; Rg=0.1 Meg; G=30; t=11 milli–seconds duration; (Note 3)	6.5	----	----	----	----	----
Post Shock and Vibration Test End Points:							
Change in Pulse Emission of in–dividual tubes:		----	$\Delta_t$egy:	----	----	20	%
Heater – Cathode Leakage:	Ehk=+100 Vdc	----	Ihk:	----	----	20	μAdc
	Ehk=–100 Vdc	----	Ihk:	----	----	20	μAdc

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RELIABLE SUBMINIATURE DOUBLE TRIODE

ELECTRICAL DATA (cont'd)

CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1)(cont d)

(In the following tests, each unit is tested separately)

TEST	CONDITIONS	AQL %	MIL-E-1 SYMBOL	MIN	MAX	MIL-E-1 UNITS
DEGRADATION RATE ACCEPTANCE TESTS (cont'd)						
Change in Transconductance (1) of individual tubes:			Δ_tSm(1):	----	20	%
Heater Current:			If:	275	325	mA
Glass Strain (Thermal Shock):		6.5	----	----	----	----
ACCEPTANCE LIFE TESTS						
Intermittent Life Test (1):	TA=room; Ehk=+200 Vdc; Rg/g=1.0 meg.; (Note 12)		t:	200	----	hours
Intermittent Life Test (1) End Points:						
Heater Current:			If:	275	325	mA
Heater-Cathode Leakage:	Ehk=+100 Vdc		Ihk:	----	10	μAdc
	Ehk=−100 Vdc		Ihk:	----	10	μAdc
Grid Current:			Ic:	0	−0.9	μAdc
Change in Transconductance (1) of individual tubes:			Δ_tSm(1):	----	15	%
Insulation of Electrodes:			Rg1−all:	50	----	Meg.
			Rp−all:	50	----	Meg.
Transconductance (2):	(Note 7)		Δ_{Ef}Sm(2):	----	15	%
Intermittent Pulse Life Test (2):	Ef=6.3 V; Ebb=150 Vdc; tp=1 μsec.; tr=tf=0.1 μsec.; Prr=2300 Pps; Ec1/ik=800 ma; Ec1=−9 Vdc (min.); Rk=1 ohm; E pulse≈110 V (Note 12)		t:	200	----	hours
Intermittent Pulse Life Test (2) End Points:						
Pulse Emission:			$\Delta_t$egy:	----	20	%
Grid Current:			Ic:	0	−1.0	μAdc
Insulation of Electrodes:			Rg1−all:	50	----	Meg.
			Rp−all:	50	----	Meg.

NOTES

Note 1: Characteristics, Quality Control Test Procedures, and Inspection Levels are made according to the appropriate paragraphs of MIL-E-1, "Inspection Instructions for Electron Tubes, and MIL-STD-105A.

Note 2: Without shield.

Note 3: The tube is subjected to 18 impacts of 30 G each. Of this total, three shock impulses shall be applied in each of 3 mutually perpendicular axes. There shall be no shorts during shock test.

Note 4: These normal values represent conditions at which control of reliability may be expected.

Note 5: These normal test conditions are used for all characteristic tests unless otherwise stated under the individual test item.

Note 6: For most applications the performance will not be adversely affected by ±5% heater voltage variation, but when the application can provide a closer control of heater voltage, an improvement in reliability will be realized.

Note 7: Change of transconductance for individual tubes from that value measured at Ef=6.3V to that value measured at Ef=5.6V.

Note 8: In addition to meeting the tightened electrical, physical and mechanical tests described in this data sheet, these Raytheon Reliable tubes are now guaranteed to be free from "Potential" defects identifiable by microscopic inspection as described by paragraph 5.3.8 of "Inspection Instructions for Electron Tubes."

Note 9: Warm-up time is the time in seconds required for the plate current to attain a value within 10 percent of the stabilized plate current measured after one minute of operation. No preheating before this test is allowed.

ELECTRICAL DATA (cont'd)

NOTES (cont'd)

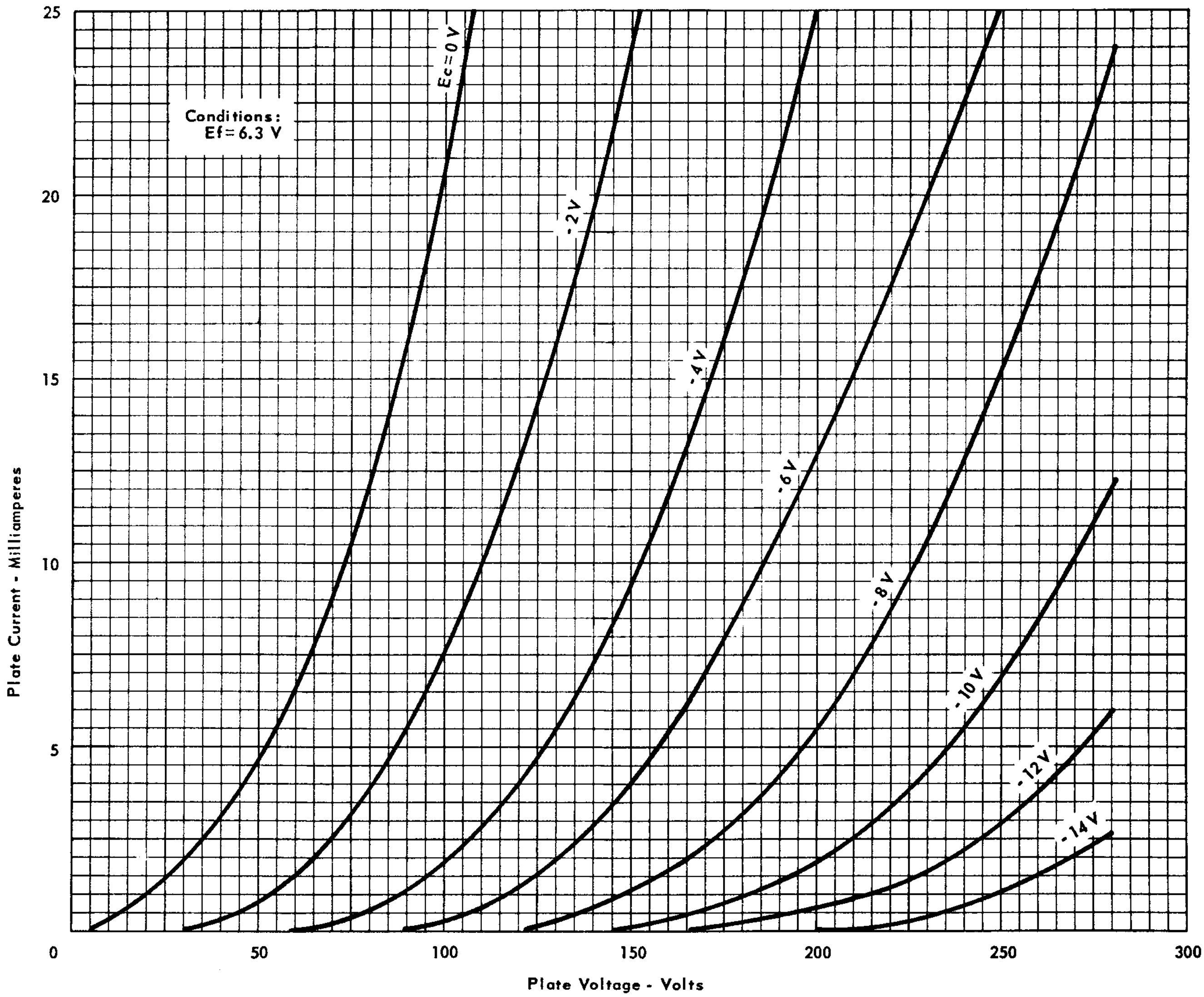
Note 10: The tubes shall be vibrated for 30 minutes in each of three mutually perpendicular planes. The time of a frequency cycle shall be 15 minutes. During the last vibration cycle the noise output shall be measured and the frequency recorded. The tube shall then be vibrated in each of the three planes for 30 minutes at a fixed frequency between 50 and 60cps for Vibration (1) and 450 and 500cps for Vibration (2). The same tubes shall be used for both vibration tests.

Note 11: (a) The temperature shall be reduced to −62°C and after the tubes have stabilized at this temperature, warm-up time shall be recorded.

(b) The tubes shall be operated continuously for 24 hours at an ambient temperature of +100°C under the conditions specified for intermittent life test (1). Upon the conclusion of this test the tubes shall meet the requirements of Pulse Emission measured at room temperature.

Note 12: The intermittent life test (1) and (2) shall be cycled 12 minutes "on", 12 minutes "off", for a total "on" time of 200 hours. The lot shall be rejected if any individual tube becomes inoperative before 100 hours.

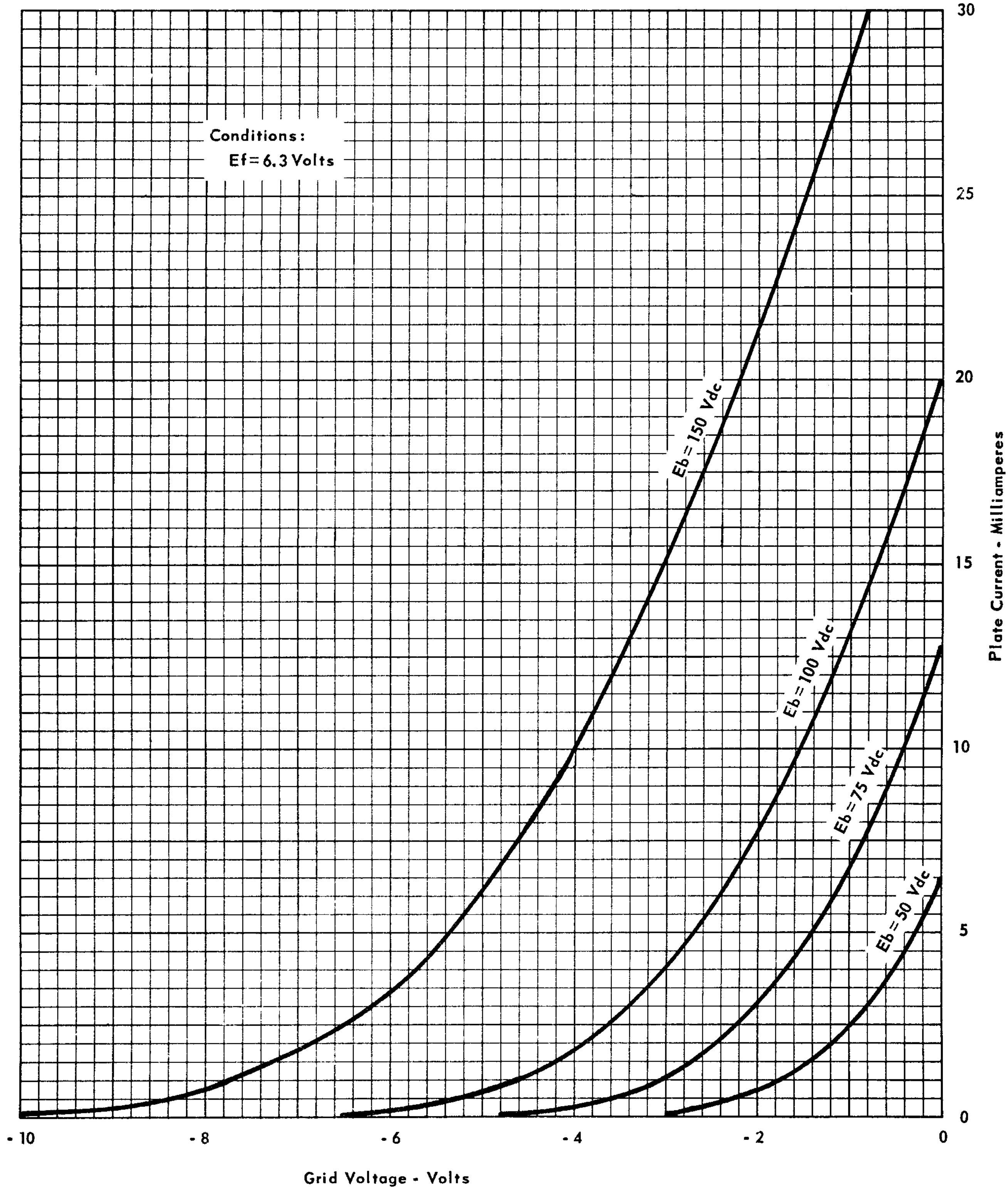
AVERAGE PLATE CHARACTERISTICS



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RELIABLE SUBMINIATURE DOUBLE TRIODE

AVERAGE CHARACTERISTICS



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AVERAGE CHARACTERISTICS

